

SUCCESS STORY

Medium-voltage solution to the Rantatunneli project

Tampere, Finland



Reliable and secure power supply in Finland's longest tunnel with fast and accurate communication.

01 Photo courtesy of the Rantatunneli project

Project at a glance

Operator: Liikennevirasto, the Finnish Transport Agency

Segment: Transport and infrastructure

ABB products: Air-insulated switchgear UniSec, Gas-insulated switchgear SafePlus, Relion® 615 protection and control relays, Combi sensors, MicroSCADA Pro, Remote Terminal Units RTU520, AFS660 switch

Customer challenge

A new tunnel was needed to contribute to the development of the city of Tampere and to improve traffic flow and safety. Building and maintaining tunnels and their electric network come with many challenges, one of which is extremely high demands for uninterrupted power supply. Power must be supplied to the traffic control system, and to ensure air ventilation and light in the tunnel at all times.

ABB solution

ABB's solution to ensure that power is distributed without any interruptions and at the same time optimize the use of space, was to introduce both the modular UniSec 24kV switchgear, which is easily extensible, and the very compact SafePlus 24kV switchgear, which is optimal for saving space.

Sensor technology ensures accurate measurements, such as voltage measurements in each bay, which is needed for directional comparison earth-fault protection. Another benefit with the combi sensors in the switchgears are the reduced wiring needed and optimized use of space.

To protect, control, measure and monitor the network throughout the entire tunnel, ABB's Relion 615 series protection relays were implemented in the solution. The role of the protection relays and the MicroSCADA Pro local distribution control system is to provide a stable, uninterrupted energy supply in the tunnel. Faults must be quickly located and information about the type of fault and its location must be immediately transmitted to the remote central control system in order to isolate the fault to a limited part of the network.

A ring distribution network was implemented to ensure fast and easy power rerouting, in case of a fault situation. The protection scheme in the network incorporates both line differential and directional comparison earth-fault protection, which is available in the RED615 protection relay. If there is a fault, the power supply is restored using an alternative route.



If there is a complete power outage from the external power supply, the protection relays give a start command to activate the reserve power system. The restoration of the power distribution grid in the tunnel is then done automatically in the MicroSCADA Pro system.

To ensure power system reliability and performance, the solution relies on horizontal GOOSE-based communication technology. GOOSE (Generic Object Oriented Substation Events) is part of the IEC 61850 standard for power system automation.

Customer benefits

- Reliable power supply and power outage prevention
- Completely automated distribution network control system
- Fast and secure protection solution and high-performing
- protection and control communication
- Reduced wiring with GOOSE communication, which leads to shorter time to commission and less maintenance
- Flexible and space saving switchgears with accurate measurement data thanks to sensor technology

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About the project

The Rantatunneli tunnel is one of Finland's biggest infrastructure projects currently in progress, and the tunnel is planned to be completed in 2017. After its completion, the tunnel will promote the development of Tampere's central areas, while also improving the functionality and safety of traffic.

The tunnel will be the longest road tunnel in Finland. It comprises two separate 2.3 kilometer traffic tunnels.

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